

# Malaria and mental disorder: a population study in an area endemic for malaria in Kenya

Malaria, a disease transmitted by blood borne plasmodium parasites from mosquito bites, is still a key contributor to morbidity and mortality in parts of sub-Saharan Africa. However, to our knowledge, there have been no previous epidemiological or clinical studies of the relationship between this disease and mental disorders<sup>1</sup>.

The potential links between malaria and mental disorders are complex. Malaria, as a debilitating physical illness, may predispose to depression, while depression may predispose to malaria by affecting immunity and by altering behaviour. Depression may hinder treatment and recovery from malaria, and vice versa. African clinicians are known to often misdiagnose complaints of fatigue and general malaise as malaria when in fact the person has no parasitaemia but suffers from depression. Such misdiagnosis may lead to erroneous prescriptions of anti-malarials, which may clear protective low-grade parasitaemia. Meanwhile the individual remains with undiagnosed and untreated depression, which may predispose to malaria and also discourage personal preventive action on malaria.

We conducted a household survey in an area of Kenya endemic for malaria in order to examine the associations between malaria and mental disorders. The detailed methods of the survey have been reported elsewhere<sup>2-8</sup>. To summarize, we drew a random sample of households from a rural health and demographic surveillance site<sup>9</sup> of over 70,000 population near Kisumu, Lake Victoria, Kenya, and selected one adult aged 16 or over at random from each household. Research nurses undertook standardized clinical interviews and blood tests for malaria parasites, which were analyzed at the Kenya Medical Research Institute.

The clinical interviews included a systematic assessment of socio-demographic variables. Moreover, we administered the Clinical Interview Schedule-Revised, which appraises the presence of depression, obsessive-compulsive disorder, panic disorder, phobic disorder, generalized anxiety disorder and mixed anxiety-depressive disorder by measuring the presence of 14 symptoms in the preceding month and the frequency, duration and severity of each symptom in the past week, and combining the symptom scores with diagnostic algorithms based on ICD-10. Alternatively, a score of 12 or more across the 14 sections of the interview is considered an indication of the presence of "any common mental disorder (CMD)".

Further assessment instruments included the Psychosis Screening Questionnaire, which measures psychotic symptoms; the WHO Adult ADHD Self-Report Scale Screener, which appraises symptoms of attention-deficit/hyperactivity disorder (ADHD); the Trauma Screening Questionnaire, which appraises symptoms of post-traumatic stress disorder (PTSD); and the Alcohol Use Disorders Identification Test for Consumption (AUDIT), which assesses hazardous drinking. We also asked questions about suicidal thoughts and attempts

(last week, last year, and lifetime), and the quantity and frequency of alcohol use.

Ethical approval was granted by the King's College London and Kenya Medical Research Institute Boards of Research Ethics. Informed written and witnessed consent was asked of heads of sampled households, and then of sampled participants, to take part in the study.

1,158 subjects consented to the study, while 32 refused to participate and 149 refused to give a blood sample, thus giving an overall response rate of 91.4%. Malaria parasites were present in 28% of participants, CMD in 10.3%, one or more psychotic symptoms in 13.9%, PTSD in 10.6%, lifetime suicidal thoughts in 7.9%, suicidal attempts in 1.9%, and hazardous drinking in 6.4%.

We conducted bivariate and multivariate analyses on the association of malaria with the various mental disorders identified by the assessment instruments, and found that the presence of malaria parasitaemia was associated at the bivariate level with increased rates of CMD (OR 1.7,  $p=0.014$ ), but not with increased rates of psychotic symptoms, ADHD, PTSD, alcohol use, hazardous drinking, or suicidal ideation or attempts. When adjusted for other variables including gender, the association between malaria and CMD remained significant (OR 1.6,  $p=0.05$ ), indicating that the risk of malaria was 60% higher in those with any CMD.

This association did not arise from shared method variance due to measurement of symptoms of malaise and fatigue, because – although CMD caseness was identified by the occurrence of 14 different psychological symptoms including fatigue and excessive concern about bodily symptoms – malaria parasitaemia was ascertained by the presence of actual malaria parasites rather than of symptoms *per se*.

The fact that we did not find an association between malaria and psychotic symptoms is interesting but not surprising, as cerebral malaria, which may present with visual hallucinations, necessitates urgent hospital admission, while our sample included all ambulant adults living at home.

The key strength of this study is the use of a large representative sample of adults in a health and demographic surveillance site, with a high response rate. Limitations included practical difficulties of collecting blood samples in the field, and getting them safely to the laboratory.

The relatively high prevalence rates of both malaria and mental disorders, and the association of malaria parasitaemia with common mental disorder, indicate the importance of strengthening the competence of front line health workers and the ability of health management information systems to record the presence of specific mental disorders as well as of comorbidity between physical and mental disorders. A biopsychosocial approach to training, supervision and health man-

agement information systems is required to address the burden of mental as well as physical disorders and their co-occurrence in sub-Saharan Africa.

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## Can reduced drinking be a viable goal for alcohol dependent patients?

Abstinence from any alcohol remains the safest treatment option for individuals with alcohol dependence, and the one associated with the best long-term outcomes.

However, many individuals with alcohol use disorders, including severe alcohol dependence, do not wish to seek treatment because they are unwilling or feel unable to engage in abstinence<sup>1</sup>. Thus, allowing for alternative treatment options that offer drinking reduction goals is an important step to decrease the treatment gap associated with alcohol use disorder.

People in treatment are likely to change their drinking goals a number of times. Acceptance of a patient's drinking goal in a client-centered approach usually helps create a stronger therapeutic alliance, and patients who initially select a moderation goal might ultimately transition to abstinence<sup>2</sup>.

Controlled studies testing this alternative approach have shown sustained drinking reductions for many patients following behavioral treatments and pharmacotherapy<sup>3,4</sup>. With reduced drinking, long-term improvements have been reported regarding mortality rates, incidence of alcohol-associated injuries and accidents, levels of mood symptoms, quality of life, social functioning, along with significant weight reduction, a normalization of systolic and diastolic blood pressure, slowed progression of alcohol-attributable liver fibrosis, and recovery of ventricular heart function<sup>5</sup>.

Treatment guidelines and the guidance papers of European and US authorities have taken note of these research findings and accept "intermediate harm reduction" (European Medicines Agency, EMA) or "low-risk drinking limits" (US Food and Drug Administration, FDA) as indicators of treatment success.

The FDA recommends a low risk drinking outcome of no heavy drinking days (where a heavy drinking day is defined as more than 70 g of alcohol for men and more than 56 g of alcohol for women). The EMA allows several harm reduction goals, including change from baseline in mean daily consumption of alcohol and reduction in number of heavy drinking days (where a heavy drinking day is defined as more than 60 g of alcohol for men and 40 g of alcohol for women).

The EMA also provides examples of the levels of reduction that could indicate a positive treatment response, including a

50%, 70% or 90% decrease in mean daily alcohol consumption or a significant categorical shift in World Health Organization (WHO)'s risk levels of drinking.

Recently, the clinical value of a shift in WHO risk levels of drinking with respect to improvement in functional outcomes has been validated in a clinical sample<sup>6</sup> and a population-based sample<sup>7</sup> of drinkers. Specifically, results indicated that even a one level shift in WHO risk levels – e.g., reduction from very high risk (61+/101+ g per day for women/men) to high risk (41 to 60/61 to 100 g of alcohol per day for women/men) – resulted in clinically meaningful decreases in drinking consequences and improvements in mental health.

Based on this compelling scientific evidence<sup>4-7</sup>, there is growing recognition that harm reduction outcomes including reduced alcohol consumption need to be considered in addition to abstinence for defining treatment success, even among alcohol dependent patients.

However, at the level of individual patients, potential limitations need to be acknowledged. The harm reduction approach may deter severely affected individuals from the difficult path towards abstinence. Even among those who accept reduced drinking as a viable treatment option, there is consensus that non-abstinence goals are less appropriate for some patients, particularly those at the severe end of the alcohol dependence continuum and pregnant/nursing women.

In conclusion, a wider acceptance of reduced alcohol consumption as a goal for dependent patients holds the potential to increase the appeal of seeking help for many of these under-diagnosed and undertreated individuals. Consequently, treatment demands could increase considerably and require additional professional involvement. This calls for a more active role of psychiatrists in counseling, monitoring and treating patients in this sensitive area of mental health care.

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